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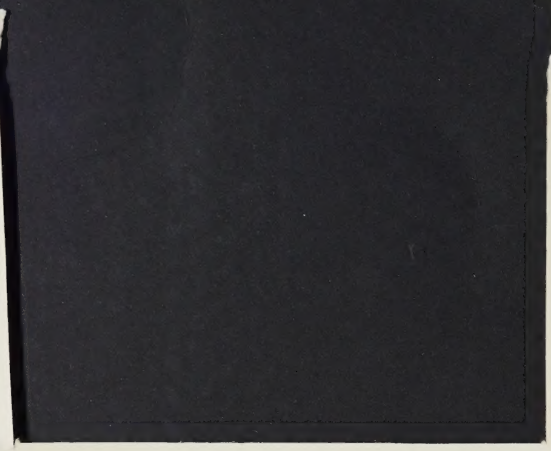
THE DIAND SOCIO-ECONOMIC IMPACT MONITORING PROGRAM: IMPACT OF PROJECT ON ECONOMIC BASE OF NORMAN WELLS, FORT NORMAN, WRIGLEY AND FORT SIMPSON

Report No. 8-84

Northern Affairs Program



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Report No. 8-84

Prepared for:

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
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PREFACE

The Norman Wells Oilfield Expansion and Pipeline Project is the first major hydrocarbon development in the North. As such, it offers unique opportunities to observe at first hand the effects of a development project on the environment, the economy and the social fabric of the region. There have been a number of extensive public review processes dealing with major development project proposals, e.g., the Berger Inquiry, and the Environmental Assessment Review Panel (EARP) on the Norman Wells Project itself, which have debated extensively the possible effects of such projects. There have, however, been relatively few opportunities to observe the effects at the time the project is in the construction phase, the time of most likely disruption in a region.

Accordingly, the Department of Indian Affairs and Northern Development mounted a monitoring program with the objective of identifying the impacts, negative and positive, of the Norman Wells Project as development proceeded. The four Mackenzie Valley communities closest to the project are Norman Wells itself, Fort Norman, Fort Simpson and Wrigley. Against the background of a database survey carried out in 1982 intended to provide the picture "before" the start of major construction, the DIAND Norman Wells Socio-Economic Impact Monitoring Program has developed a comprehensive battery of data on certain selected economic and social factors through the conduct of annual field surveys.

This program is, we believe, the first impact monitoring program of its kind, covering as it does the community situations "before", "during" and "after" project construction. The program is under the direction of Professor R.M. Bone of the University of Saskatchewan. Results are being presented in a series of technical reports pertaining to each year for which the survey has been carried out. The present report is designed to provide a comprehensive picture of the program findings from 1982 through 1984. A full list of published reports is presented in the Bibliography.

John Hucker
Director General
Northern Policy and
Coordination

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1. INTRODUCTION

This report focuses on the impact of the Norman Wells Pipeline Project on the economic base of each of the four communities located along the pipeline route. The research takes the form of case studies on Norman Wells, Fort Norman, Wrigley and Fort Simpson and is based on information provided by the DIAND Norman Wells Socio-Economic Impact Monitoring Program undertaken by members of the Geography Department, University of Saskatchewan. Specific information was compiled from the individual responses to the Business and Public Services 1982 and 1983 questionnaires.

The monitoring study provides an inventory of all the businesses (public and private) in each of the four study communities. Using this information an index of centrality is calculated for each community for both 1982 and 1983. A basis for comparison is therefore established.

The information on spatial linkage is also provided by the monitoring study. The flow of services among the communities as well as shopping expenditure patterns within the region are detailed in the monitoring study.

Industrial sector employment for the years 1981, 1982 and 1983 will be compared in order to determine whether 1982 was representative of pre-boom conditions.

2. CENTRAL PLACE THEORY AND INDEX OF CENTRALITY

Central Place Theory provides a conceptual basis for assessing the geographic distribution of the impacts of a major project (Leistriz and Murdock, 1981). The Norman Wells project should bring increased employment and income to the communities in the region. In 1980 Esso estimated that the construction of the pipeline and central processing system would require more than 4,000 man years of labour from 1982 to 1985 (Esso, 1980). After the construction has been completed the ongoing operations were estimated to require a workforce of more than 200 (Esso, 1980). The result will be increased levels of trade and service activity. There will, therefore, be accompanying adjustments in the economic relationships among the communities. The following describes how the adjustments in the economic hierarchy of the region will be determined.

Trade and service centres can be classified into a functional hierarchy according to the types of services they provide. This is established through the use of a functional index or index of centrality. This index indicates to what degree a center provides goods and services to the region as a whole. A community which provides a small number of business services which primarily meet local demand will have a small index of centrality and vice versa. By comparing the functional indices of the study communities it is possible to determine the economic hierarchy in the region. The economic relationships can be compared from year to year to monitor changes.

3. FUNCTIONAL INDEX

The first step in the process of calculating the functional index is to group the businesses into specialized functions. Statistics Canada's Standard Industrial Classification was used in this respect (Table 2). The range of functions and the frequency of occurrence for each of the communities is summarized in Tables 2 through 5. The functions are weighted according to their frequency of occurrence in all of the communities. A point score is allocated to each category based on the frequency of occurrence of that type of function in the whole system relative to all other types of functions.

Score for single function of type X

$$X = \frac{\text{All Functions in the Region}}{\text{All Functions of Type X}}$$

Table 1 summarizes the function scores for 1982 and 1983. X is then multiplied by the number of occurrences of the Function X in a particular centre. This yields "W" or a weighted score. The weighted score is calculated for each function in each community (Tables 2 through 5). The sum of the scores of all functions in a particular centre constitutes the functional index (Davies, 1967). Employment statistics have also been supplied for each industrial classification. This furnishes additional information on monitoring the impact of change in the local economy.

The following section details the results of calculating these

Table 1

Functional Index Calculation—Function Scores

Description*	Function Score 1982	Function Score 1983
Agriculture		51.75
Fishing and Trapping	58.30	69.00
Logging	175.00	207.00
Petroleum Crude	175.00	207.00
Mineral Service	43.75	51.75
Food Industries		207.00
Wood Industries		207.00
Building Contracting	9.21	9.40
Heavy Construction	87.50	51.75
Trade Contracting	35.00	20.70
Transportation	5.30	5.59
Pipeline Transport		207.00
Communications	43.75	34.50
Utility	43.75	51.75
Petroleum Wholesale	175.00	207.00
Food Beverage Wholesale	175.00	207.00
Food Beverage Retail	43.75	51.75
Household Furniture	87.50	
Auto Parts Sales Service	58.30	69.00
General Retail	58.30	69.00
Other Retail	35.00	69.00
Bank	87.50	103.50
Real Estate Sales	87.50	103.50
Business Service	35.00	23.00
Federal Government	15.90	18.81
Territorial Government	15.90	17.25
Local Government	13.46	23.00
Education	35.00	29.57
Health Social Services	21.87	23.00
Accommodation	58.30	23.00
Food Beverage Service	58.30	52.75
Amusement Recreation	175.00	103.50
Personal Household Service	175.00	103.50
Membership Organization	43.75	34.50
Other Service	17.50	17.25

*Statistics Canada, 1980. Standard Industry Classification.

indexes for the four communities over the two different time periods.

3.1 Fort Simpson (Table 2)

The highest weighted score for a function in 1982 and 1983 are 175 and 207 respectively. These functions are central to the region. In other words, these business activities are the only ones of their kind in the region. There are five of these central functions in 1982 and eight in 1983. The new central functions include Agriculture, Food Industries, Pipeline Transport, Food Beverage Wholesale. The introduction of a pipeline transport industry could be attributed to the activity associated with the Norman Wells Project. The table indicates that there is a wide range of functions in Fort Simpson relative to the other study communities (see Tables 3 through 5).

It is important to note two things at this point. First, employment by function information is provided in Tables 2 through 5 to add a further dimension to the analysis. For example, two functions in Fort Simpson in 1982 both have a weighted score of 87.50, however, the number of employees differs from 1 to 37. This indicates the limitations to using functional index calculations as the sole means of assessing the impact of a major project. The second point is that the functional indices are an indication of the relative positions of the communities in the economic hierarchy of the region.

Table 2

Industrial Composition 1982/83, Fort Simpson

Description	1982 # of Firms	1982 Total Employees	1982 Weighted Score	1983 # of Firms	1983 Total Employees	1983 Weighted Score
Agricultural				3	4	207.00
Fishing and Trapping	2	9	116.60	2	36	103.50
Food Industries				1	1	207.00
Wood Industries	1	6	175.00	1	8	207.00
Building Contracting	8	19	73.68	8	30	75.20
Trade Contracting	3	5	105.00	6	11	124.20
Transportation	17	73	90.10	18	65	100.62
Pipeline Transport				1	1	207.00
Communications	2	6	87.50	2	6	69.00
Utility	1	6	43.75	1	6	51.75
Petroleum Wholesale	1	3	175.00	1	2	207.00
Food Beverage Wholesale				1	2	207.00
Food Beverage Retail	2	11	87.50	2	11	103.50
Household Furniture	1	1	87.50			
Auto Parts Sales Service	1	2	58.30	1	3	69.00
General Retail	1	22	58.30	1	17	69.00
Other Retail	3	9	105.00	2	11	138.00
Bank	1	8	87.50	1	7	103.50
Real Estate Sales	1	1	87.50	1	1	103.50
Business Service	3	25	105.00	3	17	69.00
Federal Government	6	69	95.40	6	64	112.86
Territorial Government	6	41	95.40	6	53	103.50
Local Government	3	52	26.92	4	45	92.00
Education	2	46	70.00	2	45	59.14
Health Social Services	4	37	87.48	4	31	92.00
Food Beverage Service	3	16	175.00	3	16	155.25
Accommodation	1	10	58.30	1	11	23.00
Amusement Recreation	1	1	175.00	2	2	207.00
Personal Household Service	1	1	175.00	2	2	207.00
Membership Organization	3	8	131.25	3	9	103.50
Other Service	9	18	157.50	8	15	138.00
Total	87	505		97	532	
	Functional Index:		2790.38	Functional Index:		3715.02

3.2 Norman Wells (Table 3)

Norman Wells offers a lower range of functions than Fort Simpson. This is clear by comparing the list of services and their weighted scores for Norman Wells and Fort Simpson (Tables 2 and 3). There are a few functions which are central to the region. These contribute in a significant manner to the functional indexes of both 1982 and 1983. It is clear that the utility of the functional index is limited in this context for some of the functions that are denoted as central to the region according to the formulation of the functional index are specific to the Norman Wells Pipeline project and, therefore, do not perform a regional function. These include petroleum crude, mineral service, and heavy construction. As these industrial categories contribute in a major way to the functional index, it is safe to assume that the functional indices for Norman Wells for 1982 and 1983 are inflated.

3.3 Fort Norman (Table 4)

Fort Norman has a significantly lower range of functions than Norman Wells. There are no functions which have a high weighted score. This indicates that Fort Norman plays a minor regional service role.

3.4 Wrigley (Table 5)

Wrigley has very few functions and all have low weighted scores. This is indicative of a low order centre which plays no regional serving function as it serves local needs only. In both Wrigley and Fort Norman

Table 3

Industrial Composition 1982/83, Norman Wells

Description	1982 # of Firms	1982 Total Employees	1982 Weighted Score	1983 # of Firms	1983 Total Employees	1983 Weighted Score
Logging	1	2	175.00	1	2	207.00
Petroleum Crude	1	162	175.00	1	287	207.00
Mineral Service	4	8	175.00	4	45	207.00
Building Contracting	9	69	82.89	12	314	112.80
Heavy Construction	2	7	175.00	4	123	207.00
Trade Contracting	2	29	70.00	4	23	82.80
Transportation	12	89	63.60	16	110	89.40
Communications	1	2	43.75	2	6	69.00
Utility	1	8	43.75	1	7	51.75
Food Beverage Wholesale	1	1	175.00			
Food Beverage Retail	2	4	87.50	2	4	103.50
Furniture Retail	1	1	87.50			
Auto Parts Sales Service	1	5	58.30	1	14	69.00
Other Retail Stores	2	3	70.00	1	3	69.00
Bank	1	4	87.50	1	7	103.50
Business Service	2	9	70.00	6	51	138.00
Federal Government	2	22	31.80	2	22	37.62
Territorial Government	3	10	47.70	4	14	69.00
Local Government	4	15	53.84	4	18	92.00
Education	1	6	35.00	1	13	29.57
Health Social Services	1	4	21.87	2	5	46.00
Accommodation	1	70	58.30	6	163	138.00
Food Beverage Service				1	6	51.75
Personal Household Service				1	3	103.50
Membership Organization				1	1	34.50
Other Service	1	2	17.50	3	33	51.75
Unknown					7	
Total	56	532		81	1281	
	Functional Index:		1905.80	Functional Index:		2370.48

Table 4

Industrial Composition 1982/83, Fort Norman

Description	1982 # of Firms	1982 Total Employees	1982 Weighted Score	1983 # of Firms	1983 Total Employees	1983 Weighted Score
Fishing and Trapping	1	8	58.30	1	9	51.75
Building Contracting	2	10	18.42	4	12	37.60
Transportation	3	6	15.90	2	4	11.18
Communications	1	1	43.75	2	2	68.40
Utility	1	1	43.75	1	1	57.75
General Retail	1	6	58.30	1	7	69.00
Real Estate Sales	1	3	87.50	1	3	103.50
Federal Government	2	10	31.80	2	11	37.62
Territorial Government	2	5	31.80	2	5	34.50
Local Government	4	21	53.84	3	19	69.00
Education	1	6	35.00	3	12	88.71
Health Social Services	2	8	43.74	2	5	46.00
Accommodation	1	2	58.30	2	4	46.00
Membership Organization	1	5	43.75	2	4	69.00
Other Service				1	1	17.25
Total	23	92		29	99	
	Functional Index:		624.15	Functional Index:		801.26

Table 5

Industrial Composition 1982/83, Wrigley

Description	1982 # of Firms	1982 Total Employees	1982 Weighted Score	1983 # of Firms	1983 Total Employees	1983 Weighted Score
Fishing and Trapping	1	14	58.30	1	10	51.75
Transportation	1	2	5.30	1	2	5.59
Utility	1	1	43.75	1	1	51.75
Auto Parts Sales Service	1	2	58.30	1	2	69.00
General Retail	1	6	58.30	1	7	69.00
Federal Government	1	6	15.90	1	7	18.81
Local Government	2	22	13.46	2	9	23.00
Education	1	4	35.00	1	4	29.57
Health Social Services	1	3	21.87	1	2	23.00
Total	10	60		10	44	
	Functional Index:		310.18	Functional Index:		341.47

public sector functions constitute a high percentage of the functional index. This tends to indicate that these centres have a strong administrative role.

3.5 Summary

The functional indexes for the four communities for 1982 and 1983 are summarized in Table 6. With reference to Table 6, each of the centres establishes itself as being on a distinctively different level in the central place hierarchy. These levels are from highest to lowest—Fort Simpson, Norman Wells, Fort Norman and Wrigley. This observation holds true for both 1982 and 1983.

Most surprising, however, is the fact that their respective percentage of the total or rather their relative positions remained the same. It was expected that Norman Wells would have established itself higher in 1983 than in 1982 relative to the other centres in the region. This was expected due to the influx of population to Norman Wells which would meet thresholds for higher order functions. The reasons for this anomaly will become evident later in this study.

Table 6

Functional Index Summary

	Functional Index 1982	% of Total	Functional Index 1983	% of Total
Fort Simpson	2,790.38	50	3,715.02	51
Norman Wells	1,905.80	34	2,370.48	33
Fort Norman	624.15	11	801.26	11
Wrigley	310.18	5	341.47	5
Total	5,630.51	100	7,228.23	100

4. SPATIAL LINKAGES DERIVED FROM THE FLOW OF SERVICES

The second component of this study examines the spatial relationships between study communities over the period 1982-1983 in order to assess the impact of the Norman Wells project. This is achieved by examining the flows of service within the region and the shopping expenditure pattern.

The flow of services information stems from a question on the business survey portion of the monitoring study which asks the responding firm or agency to indicate the percentage of total services which is provided to other centres in the region. As all communities in the region are detailed in this question, not only the four study communities, it is possible to make an assessment of the centrality or regional serving function of the communities.

4.1 Fort Simpson (Table 7)

In 1982 Fort Simpson provides services to all communities in the region. Fort Simpson is, therefore, established as a regional centre in this respect. This confirms the results of the functional index calculations.

A note of explanation is due for the Tables 7 through 10. Using Fort Simpson (Table 7) as an example: 19 firms in Fort Simpson supplied services to Fort Liard in 1982, this represented 17% of all firms in Fort Simpson. Of the firms that supplied services to Fort Liard, the

Table 7

Service Linkages 1982/83, Fort Simpson

Community	1982 Service to	1982 % of all Businesses	1982 Service Average %	1983 Service to	1983 % of all Businesses	1983 Service Average %
Fort Franklin	1	1	1	—	—	—
Fort Good Hope	1	1	2	—	—	—
Fort Liard	19	17	9	19	18	10
Fort Norman	5	5	6	1	1	1
Fort Simpson	110	100	86	104	100	78
Inuvik	2	2	1	—	—	—
Jean Marie River	23	21	5	21	21	6
Nahanni Butte	20	18	6	14	14	7
Norman Wells	10	9	2	4	4	16
Trout Lake	21	19	7	17	17	7
Wrigley	32	29	7	27	27	10
Yellowknife	6	5	23	3	3	43
Other Northern	15	14	20	8	8	14
	Total Businesses: 110			Total Businesses: 104		
	66 or 60% provide local service only			57 or 55% provide local service only		

Source: Business Survey 1982, 1983.

amount of business that went to Fort Liard as a percentage of all business undertaken in the region was 9%. To get an estimation of the percentage of business that is provided to the surrounding region the difference between the service average percentage Fort Simpson provides to itself and one hundred percent is taken. I.e. 100% - 86% = 14% or 14 percent of total services provided for Fort Simpson is provided to communities in the region. In 1982, with the exception of Yellowknife, the service average was minimal. In addition, there was a high percentage (60%) of firms providing local service only. There is a significant difference in the service flows between 1982 and 1983. Despite the fact that in 1983 service is no longer provided to Fort Franklin, Fort Good Hope and Inuvik, regional services increased from 14 percent to 22 percent. This is consistent with the decrease in number of firms providing local service only. This would represent an increase in the export base sector if the firms involved were in the private sectors, however, a cursory examination reveals that the majority are related to government activities which means that there is only a small increase in the export or value added sector.

The notable increase between 1982 and 1983 is with Norman Wells and Yellowknife. However, in both cases the number of firms decreased, making it difficult to compare the two years. Certainly there was not an increase in either the number of firms or in the amount of business service provided to Norman Wells as was expected under the conditions.

4.2 Norman Wells (Table 8)

In 1982 Norman Wells does not provide services to five of the communities in the region. This is indicative that it is of a lower order centre than Fort Simpson; it offers lower threshold services. This also confirms the results of the functional index calculations. Unlike Fort Simpson, Norman Wells appears to have stronger ties (higher service average) with its lower order centres. This is assumed to be a result of their proximity to Norman Wells. There is a high percentage of firms providing local service only. Most notable is that only 3 percent of total service is provided to the surrounding region. Norman Wells is, therefore, very isolated and necessarily highly self sufficient.

The basic pattern remains the same in 1983 with the exception that in 1983 Norman Wells provides services to Yellowknife. There is a higher percentage of total services provided beyond Norman Wells, i.e., 10 percent vs. 3 percent. However, there is a much higher percentage of firms providing local service only (specialized project related).

It was anticipated that there would be an increase in services provided to other communities in the region on a much broader scale than indicated by these results. The drastic increase in population associated with the project should be reflected in an increase in the amount of services provided to other communities in the region.

Table 8

Service Linkages 1982/83, Norman Wells

Community	1982			1983		
	Service to	% of all Businesses	Service Average %	Service to	% of all Businesses	Service Average %
Fort Franklin	14	16	13	13	15	12
Fort Good Hope	13	15	11	12	14	10
Fort Liard	—	—	—	—	—	—
Fort Norman	20	23	16	14	16	13
Fort Simpson	—	—	—	2	2	18
Inuvik	5	6	13	1	1	10
Jean Marie River	—	—	—	—	—	—
Nahanni Butte	—	—	—	—	—	—
Norman Wells	89	100	97	86	100	90
Trout Lake	—	—	—	—	—	—
Wrigley	1	1	1	—	—	—
Yellowknife	3	3	14	—	—	—
Other Northern	13	14	58	7	8	11
	Total Businesses: 89			Total Businesses: 86		
	56 or 63% provide local service only			63 or 73% provide local service only		

Source: Business Survey 1982, 1983.

4.3 Fort Norman (Table 9)

Fort Norman plays a limited service function in 1982 and 1983. There is a decrease in the percentage of businesses providing local service only and a corresponding strengthening of existing ties.

4.4 Wrigley (Table 10)

Wrigley plays no regional service function in 1982 and a very limited one in 1983.

4.5 Summary

In summary, there is a definite hierarchy of central places according to the flows of services. This corresponds to the hierarchy as determined by the functional index calculations. The Norman Wells project has had no appreciable impact on the spatial relationships among the study communities based on the flows of services.

Table 9

Service Linkages 1982/83, Fort Norman

Community	1982 Service to	1982 % of all Businesses	1982 Service Average %	1983 Service to	1983 % of all Businesses	1983 Service Average %
Fort Franklin	1	3	3	2	7	38
Fort Good Hope	—	—	—	—	—	—
Fort Liard	—	—	—	—	—	—
Fort Norman	30	100	99	29	100	94
Fort Simpson	—	—	—	—	—	—
Inuvik	—	—	—	1	3	5
Jean Marie River	—	—	—	—	—	—
Nahanni Butte	—	—	—	—	—	—
Norman Wells	3	10	7	3	10	27
Trout Lake	—	—	—	—	—	—
Wrigley	1	3	2	—	—	—
Yellowknife	—	—	—	—	—	—
Other Northern	—	—	—	—	—	—
	Total Businesses: 30			Total Businesses: 29		
	27 or 90% provide local service only			23 or 79% provide local service only		

Source: Business Survey 1982, 1983.

Table 10

Service Linkages 1982/83, Wrigley

Community	1982			1983		
	Service to	% of all Businesses	Service Average %	Service to	% of all Businesses	Service Average %
Fort Franklin	—	—	—	—	—	—
Fort Good Hope	—	—	—	—	—	—
Fort Liard	—	—	—	—	—	—
Fort Norman	—	—	—	—	—	—
Fort Simpson	—	—	—	—	—	—
Inuvik	—	—	—	—	—	—
Jean Marie River	—	—	—	—	—	—
Nahanni Butte	—	—	—	—	—	—
Norman Wells	—	—	—	—	—	—
Trout Lake	—	—	—	—	—	—
Wrigley	10	100	100	8	100	90
Yellowknife	—	—	—	—	—	—
Other Northern	—	—	—	1	13	10

Source: Business Survey 1982, 1983

5. SPATIAL LINKAGES DERIVED FROM SHOPPING EXPENDITURE PATTERNS

The next step in this study is to examine the shopping expenditure pattern. Shopping patterns will indicate a hierarchy among the study communities with respect to the provision of goods. It will also identify higher order centres outside the region.

The shopping expenditure information arises from the results of a question on the household survey which asks the respondent to indicate what percentage of their total shopping bill is spent within the region and also in other higher order centres outside the region. Unfortunately, this information is only provided for 1982, however, it is safe to assume that the pattern remains constant for 1983 for the service linkages remain constant.

5.1 Fort Simpson

Table 11 summarizes the shopping expenditure pattern. With reference to Table 11, the majority of the disposable income is spent locally, however, a high proportion of respondents indicated that they spent a significant proportion of their shopping bill in higher order centres outside the region. This is an indication of the paucity of higher order goods provided in Fort Simpson. As Fort Simpson is the highest order centre in the region this then indicates the lack of provision of goods in the entire region.

Table 11

Shopping Expenditure Patterns

	% of Population	Spent on Average %	In
Fort Simpson	100	70	Fort Simpson
	55	14	Hay River
	52	17	Edmonton
	45	12	Regina
	37	8	Yellowknife
Norman Wells	98	32	Norman Wells
	81	42	Edmonton
	73	22	Yellowknife
	25	27	Hay River
	21	7	Inuvik
	16	6	Fort Norman
Fort Norman	71	85	Fort Norman
	60	13	Norman Wells
	27	8	Yellowknife
	19	6	Inuvik
	10	16	Edmonton
Wrigley	100	78	Wrigley
	86	13	Fort Simpson
	43	9	Fort Norman
	33	7	Yellowknife

Source: Household Survey, 1981.

5.2 Norman Wells

This pattern of spending in higher order centres is exemplified in Norman Wells. As Norman Wells is the location of the majority of the impact of the project, little by the way of consumer spending is capitalized on by northern businesses. Even if certain goods were available in Fort Simpson the transportation cost (air fare) differential would favor Yellowknife and points beyond over Fort Simpson. This tremendous leakage from Norman Wells explains why the functional index or the position on the central place hierarchy did not shift upwards as expected. The demand or thresholds for the establishment of new service-oriented firms were not realized as they were, in effect, being shifted to higher order centres outside the region. It is these places that capitalized on the beneficial impacts (increased incomes) of the Norman Wells project. In addition due to the short time period of high population it is not reasonable to expect capital investment in firms to provide goods and services for such a short period.

5.3 Fort Norman/Wrigley

Respondents from both Fort Norman and Wrigley indicate that they spent the majority (approximately 80%) of their total shopping bill locally. This is a function of the isolation of these communities coupled with low disposable incomes. Lower overall wages effectively increases the friction of distance (air travel) to higher order centres outside the region. A high percentage of respondents from Fort Norman

indicated that they spent a significant amount of their total shopping bill in Norman Wells. This is due to the fact that Norman Wells provides a wider range of goods and that Fort Norman is in close proximity to Norman Wells.

5.4 Summary

With the exception of Norman Wells, respondents indicated that they spent a high percentage (70-80%) of their total shopping bill locally. This is primarily due to the isolation of these communities and generally low income levels which make it difficult to pay the costs of transportation.

In Norman Wells, however, the majority of shopping expenditures (68%) are made in higher order centres outside the region. The residents of Norman Wells have sufficiently high incomes to offset the additional cost imposed by isolation. Considering that: (1) Norman Wells is the site of the majority of the impacts of the project, (2) a high percentage of the construction workforce were commuters, and (3) Norman Wells residents spend a low percentage of their disposable income in the region; little by the way of consumer spending was capitalized on by northern businesses. The leakage of income out of the region is a result of the lack of availability of goods in the north.

The implications on the impact of the boom economy is that the increased disposable income does not remain within the region but more importantly the potential spinoffs and related multipliers are not captured.

6. INDUSTRIAL SECTOR EMPLOYMENT

The final section of this study examines industrial sector employment. The purpose of this section is to compare the industrial sector employment figures as determined by the Norman Wells socio-economic monitoring study for 1982 and 1983 and compare them to those generated by Statistics Canada in 1981. In order to facilitate this comparison it was necessary to collapse the employment figures which were grouped according to Statistics Canada's Standard Industrial Classification from the monitoring study into the broader industrial sectors which were used in the 1981 census. The results are indicated in Tables 12 through 15. The intention of the comparison is to establish if 1982 was truly reflective of pre-boom conditions.

This analysis will focus on Norman Wells as it is the site of the main impact of the project, the other community did not indicate any appreciable increase in employment over the period 1981 to 1983 (Tables 12 through 15). For Norman Wells, comparing industrial sector employment--total employees per sector as a percentage of all sectors (Table 13) between 1981 and 1982 it is evident that there is a significant increase in total employees and that there is a shift in the relative percentages among the sectors. The primary industries, construction, transportation and community, personal and business service all increased drastically. Trade decreased absolutely and public administration and defence decreased relatively. Between 1982 and 1983 there is again a drastic increase in employees in the primary

Table 12

Industrial Sector Employment, 1981-83, Fort Simpson

Industrial Sector	1981[1] Employees		1982[2] Employees		1983[2] Employees	
	Total	%	Total	%	Total	%
Primary Industries	15	3	9	2	39	8
Manufacturing	10	2	6	1	9	2
Construction	60	13	24	5	35	7
Transportation, Communication	40	9	85	17	67	13
Trade	40	9	48	9	46	9
Finance, Insurance, Real Estate	10	2	9	2	8	2
Community, Business, Personal Service	115	26	162	32	135	27
Public Administration, Defence	165	6	162	32	157	32
	455	100	505	100	496	100

[1]Source: Statistics Canada, 1981.

[2]Source: Norman Wells Project, 1982 and 1983, Business Surveys.

Table 13

Industrial Sector Employment, 1981-83, Norman Wells

Industrial Sector	1981[1] Employees		1982[2] Employees		1983[2] Employees	
	Total	%	Total	%	Total	%
Primary Industries	50	23	164	30	289	23
Construction	20	9	105	20	460	35
Transportation, Communication	45	20	95	18	123	10
Trade	40	18	14	3	21	2
Finance, Insurance, Real Estate	5	3	4	3	7	1
Community, Business, Personal Service	20	9	99	18	323	25
Public Administration, Defence	40	18	47	8	54	4
	220	100	538	100	1277	100

[1]Source: Statistics Canada, 1981.

[2]Source: Norman Wells Project, 1982 and 1983, Business Surveys.

Table 14

Industrial Sector Employment, 1981-83, Fort Norman

Industrial Sector	1981[1] Employees		1982[2] Employees		1983[2] Employees	
	Total	%	Total	%	Total	%
Primary Industries	—	—	8	9	9	10
Construction	15	18	10	11	12	13
Transportation, Communication	5	6	8	9	6	6
Trade	15	18	6	6	7	7
Finance, Insurance	5	6	3	3	3	3
Community, Business, Personal Service	25	29	20	22	24	25
Public Administration, Defence	20	23	36	40	34	36
	85	100	91	100	95	100

Table 15

Industrial Sector Employment, 1981-83, Wrigley

Industrial Sector	1981[1] Employees		1982[2] Employees		1983[2] Employees	
	Total	%	Total	%	Total	%
Primary Industries			14	24	10	23
Transportation, Communication	5	17	3	1	3	7
Trade	10	33	8	14	9	20
Community, Business, Personal Service	10	33	7	13	6	16
Public Administration, Defence	5	17	28	48	16	36
	30	100	60	100	44	100

[1]Source: Statistics Canada, 1981.

[2]Source: Norman Wells Project, 1982 and 1983, Business Surveys.

industry, construction and community, personal and business service sectors.

It is clear that 1982 was not reflective of pre-boom conditions at Norman Wells. There was certainly anticipation and speculation surrounding the project. This report, therefore, does not measure the full impact of the project on the functionality and spatial linkages of the communities. Table 13 does, however, indicate that the majority of the impact is captured between 1982 and 1983.

7. CONCLUSIONS

It is evident that the impact of the boom economy associated with the Norman Wells Pipeline Project to date has been focussed on Norman Wells. There has been minimal economic development stimulated in communities in the surrounding region. Furthermore, the businesses in Norman Wells failed to capture the opportunities that the increase in population and disposable income associated with the project presented. There was little diversification of the local economy of any lasting nature. The benefits, in the form of increased disposable income, potential spinoffs and associated multipliers, were leaked out of the region. This was due to the lack of infrastructure in Norman Wells and, indeed in the region, capable of capturing the benefits. It was also partially due to the short time span of the project.

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Copies of these reports can be obtained by contacting Norman Wells Project, Department of Indian Affairs and Northern Development, Les Terrasses de la Chaudiere, Ottawa, K1A OH4.